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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/183,479	10/30/1998	MICHAEL JAMES LIBERATORE	SAR12743	3193

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EXAMINER

MAYES, MELVIN C

ART UNIT	PAPER NUMBER
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1734

DATE MAILED: 04/05/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/183,479

Applicant(s)

LIBERATORE ET AL.

Examiner

Melvin C. Mayes

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 October 2001.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7,9 and 11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7,9 and 11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

(1)

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

(2)

Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over IBM Technical Disclosure Bulletin (August 1974) in view of Amendola et al. 4,546,065 for the reasons as set forth in the previous Office Action.

IBM Technical Disclosure Bulletin (August 1974) discloses a method of making a multilayer ceramic module comprising: providing ceramic green sheets, forming recesses in the green sheets by mechanically stamping; filling the recesses with metal paste by screen-printing, laminating green sheets and firing. The IBM Bulletin does not specifically state that stamping involves using an embossing tool under heat and pressure.

Amendola et al. teach that embossing grooves and pads into a ceramic green sheet involves pressing against the surface of the greensheet, a die which carries a raised mirror image of the desired pattern to that after removal of the die, the greensheet carries the desired pattern as indentations or recesses. Embossing conditions involve heating the greensheet to a temperature at which the binder in the greensheet flows and can be shaped under pressure such as 75° to about 95°C and pressure of 500 to 3000 psi (col. 7, lines 3-33).

It would have been obvious to one of ordinary skill in the art to have mechanically stamped the recesses in the greensheets in the method of IBM (August 1974) by using a die

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having a raised mirror image of the pattern and pressing against the greensheets under heat and pressure as taught by Amendola et al. as used to emboss grooves and pads into a ceramic green sheet, the embossing conditions involving heating the greensheet to a temperature at which the binder in the greensheet flows and can be shaped under pressure. Mechanically stamping the recesses in the greensheets by using a die under heat and pressure would have been obvious to one of ordinary skill in the art as taught by Amendola et al.

Screen printing the green sheets using a silver screen printing paste of silver powder and having of a viscosity of about 30 poise would have been obvious to one of ordinary skill in the art as silver is well known in the art of making multilayer ceramic modules as a metal used in metallic paste used to make a multilayer ceramic module and as about 30 poise is a suitable viscosity for a paste for screen printing conductor patterns in the indentations in the green sheets and would have been obvious to one of ordinary skill in the art.

(3)

Claims 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to Claim 1, and further in view of Vitriol et al. for the reasons as set forth in the previous Office Action.

Vitriol et al. teach that in a multi-layer co-fired ceramic, electrical circuit patterns on the green sheets include not only metallizations but may further include resistors, capacitors, inductors and other electrical components compatible with the process, the patterns formed on the sheets by screening or any other suitable method (col. 4, lines 57-63).

It would have been obvious to one of ordinary skill in the art to have modified the method of the references as combined for making a multi-layer ceramic module by also screen

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printing resistors, capacitors or inductors in the recesses in the green sheets as taught by Vitriol et al. as also screened on green sheets for making a multi-layer, co-fired ceramic laminate.

Screen printing the green sheets with conductive paste to form inductors, with resistor paste, or with capacitor paste would have been obvious to one of ordinary skill in the art as Vitriol et al.

teach that in a multi-layer co-fired ceramic, these electrical components may also be included by screen printing.

Screening capacitors using an ink or paste of lead magnesium niobate or barium titanate, as claimed in Claims 6 and 7, would have been obvious to one of ordinary skill in the art as these materials conventionally used for capacitors.

(4)

Claims 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to Claim 1, and further in view of Prabhu 5,277,724 for the reasons as set forth in the previous Office Action.

Prabhu teaches that multi-layered, co-fired ceramic on a metal base is formed by utilizing a bonding layer of low softening point glass and co-firing to bond the ceramic to the metal base. The bonding layer of glass provides a means of attaching the multi-layered ceramic to the base and minimizes shrinkage of the ceramic during the firing (col. 1, line 55 - col. 2, line 48).

It would have been obvious to one of ordinary skill in the art to have modified the method of the references as combined for making a multilayer ceramic module by co-firing the laminated green sheets on a metal base using a low melting bonding layer of glass as taught by Prabhu for attaching a multi-layered ceramic to a base and minimize shrinkage of the ceramic during firing.

Response to Arguments

(5)

Applicant's arguments filed October 25, 2001 have been fully considered but they are not persuasive.

Applicant argues that the IBM reference does not disclose embossing, forming transmission lines or openings for buried passive components, or filling of the openings, as required by the present claims. Applicant argues that the openings in the reference are formed during firing, argues that the multi-step method of Amendola et al. is not necessary and argues that there is no mention of embossing in Vitriol.

(6)

Applicant claims in Claim 1 embossing a channel **or** opening on the surface of a green tape and screen printing a suitable ink into the channels **or** openings while Claim 9 claims filling said opening by screen printing with an ink including said component material. Thus Claim 1 is not limited to forming openings for buried passive components, as argued, but encompasses embossing a channel and screen printing a suitable ink into the channels.

The IBM August 1974 reference discloses forming recesses in the green sheets by mechanically stamping and filling recesses with metal paste by screen-printing while filling other recesses with filler paste. Thus the steps of embossing a channel and screen printing or filling as claimed are disclosed or suggested by IBM August 1974 regardless of whether other openings are filled with a filler paste to form air gaps.

The Amendola et al. is not applied because of the particular multi-step method disclosed by the reference but because of its teaching that embossing grooves and pads into a ceramic green

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sheet involves pressing a die against the surface of the greensheet, the die carrying a raised mirror image of the desired pattern to that after removal of the die, the greensheet carries the desired pattern as indentations or recesses, and the embossing conditions which involve heating the greensheet to a temperature at which the binder in the greensheet flows and can be shaped under pressure such as 75° to about 95°C and pressure of 500 to 3000 psi. This teaching is pertinent to the embossing as suggested by the IBM reference for forming the recesses.

Vitriol et al. is pertinent because the references teaches that in a multi-layer co-fired ceramic, electrical circuit patterns on the green sheets include not only metallizations but may further include resistors, capacitors, inductors and other electrical components compatible with the process, the patterns formed on the sheets by screening or any other suitable method. Thus it would have been obvious to one of ordinary skill in the art to have also screen printed resistors, capacitors or inductors in the recesses in the green sheets as taught by Vitriol et al. as also screened on green sheets for making a multi-layer, co-fired ceramic laminate.

Conclusion

(7)

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Parker discloses producing cavities and grooves in a substrate made of suitable material such as a ceramic using a heated punch and filling the grooves with conductive material and the cavities with electrical components.

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(8)

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.


(9)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melvin C. Mayes whose telephone number is 703-308-1977. The examiner can normally be reached on Mon-Fri 7:30 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on 703-308-3853. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



Melvin C. Mayes
Primary Examiner
Art Unit 1734

MCM
April 3, 2002